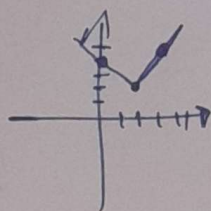
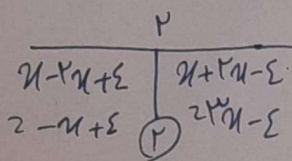


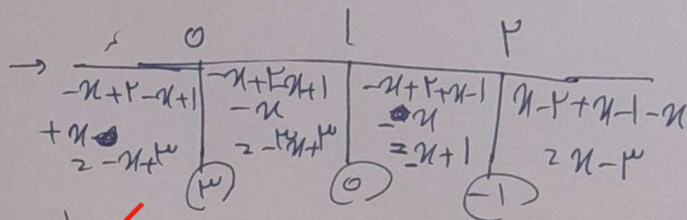
۱) الف) $y = x + |2x - 1|$



$Ry = [0, +\infty)$ ✓

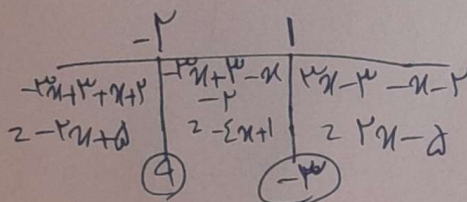
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ب) $y = |x - 2| + |x - 1| - |x|$



$\rightarrow Ry = [-1, +\infty)$ ✓

۲) $|3x - 3| - |x + 2| + 2x$

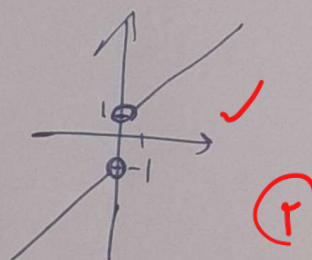


برای اینکه یکرشته داشته باشد

$\rightarrow x = 3$ ✓

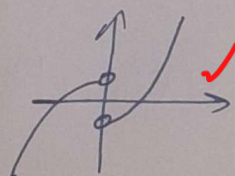
۲

۳) الف) $y = x + \frac{x}{|x|} \rightarrow y = \begin{cases} x > 0 & x + 1 \\ x < 0 & x - 1 \\ x = 0 & \text{تن}$

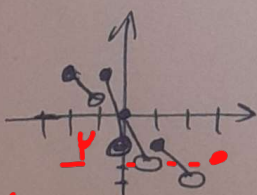


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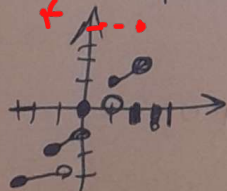
ب) $y = x|x| - \frac{x}{|x|} \rightarrow y = \begin{cases} x > 0 & x^2 - 1 \\ x < 0 & -x^2 + 1 \\ x = 0 & \text{تن} \end{cases}$



۴) الف) $y = [x] - 2x$



ب) $y = [x] |x|$



خط بقیه بندی ها رو قیما بنویسید
انتهای بازه را هم باید مشخص کنید

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۵) الف) $y = 3x - [3x] \rightarrow 0 \leq 3x - [3x] < 1 \rightarrow Ry = [0, 1)$ ✓

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ب) $y = 2x - [x] \rightarrow x - [x - [x]] \rightarrow Ry = [0, 1)$ ✓

ج) $y = x - \delta[\frac{x}{\delta}] \rightarrow \delta(\frac{x}{\delta} - [\frac{x}{\delta}]) \rightarrow Ry = [0, \delta)$ ✓

$$3) y = [\cos x] - \cos x \rightarrow -1 \leq [\cos x] - \cos x \leq 0 \rightarrow R_y = [-1, 0] \checkmark$$

$$4) \text{ ا) } y = 2\sin x + \cos x \rightarrow -\sqrt{4+1} \leq \boxed{2\sin x + \cos x} \leq \sqrt{4+1} \rightarrow -\sqrt{5} \leq A \leq \sqrt{5} \rightarrow R_y = [-\sqrt{5}, \sqrt{5}] \checkmark$$

$$\text{ب) } y = 2\sin x - \cos x \rightarrow -\sqrt{4+1} \leq \boxed{2\sin x - \cos x} \leq \sqrt{4+1} \rightarrow -\sqrt{5} \leq B \leq \sqrt{5} \rightarrow R_y = [-\sqrt{5}, \sqrt{5}] \checkmark$$

$$\text{ج) } y = [2\sin x + \cos x] \rightarrow -\sqrt{4+1} \leq [2\sin x + \cos x] \leq \sqrt{4+1} \rightarrow -\sqrt{5} \leq \text{...} \leq \sqrt{5} \rightarrow R_y = [-\sqrt{5}, \sqrt{5}] \checkmark$$

$$\text{د) } y = \sqrt{\cos x - \sin x} \rightarrow -\sqrt{1} \leq \cos x - \sin x \leq 0 \rightarrow 0 \leq \cos x - \sin x \leq 1 \rightarrow R_y = [0, 1] \checkmark$$

$$\text{هـ) } y = 2\sin x + \sin x + 1 \rightarrow \sin x \begin{matrix} 1 \\ -1 \\ 0 \end{matrix} \rightarrow \frac{1}{2} \leq y \leq \frac{3}{2} \rightarrow R_y = [\frac{1}{2}, \frac{3}{2}] \checkmark$$

$$\text{و) } y = 2\sin x + \cos x + 1 \rightarrow \sin x \begin{matrix} 1 \\ -1 \\ 0 \end{matrix} \rightarrow \frac{1}{2} \leq y \leq \frac{3}{2} \rightarrow R_y = [\frac{1}{2}, \frac{3}{2}] \checkmark$$

$$\text{أ) ا) } y = 2\sin x + \cos x \rightarrow y = 2\sin x + [(1 - \sin x) + \sin x] + \cos x \rightarrow 2 - \sin x + \cos x \rightarrow R_y = [1, 2] \checkmark$$

$$\text{ب) } y = \frac{\cos x}{1 + \cos x} = \frac{\cos x}{\sin x} = \cot x \rightarrow R_y = (-\infty, \infty) \checkmark$$

$$\text{ج) } y = \sin^2 x + \cos^2 x \rightarrow 0 \leq \sin^2 x + \cos^2 x \leq 1 \rightarrow \frac{1}{2} \leq A \leq 1 \rightarrow R_y = [\frac{1}{2}, 1] \checkmark$$

$$\text{د) } y = [\sin^2 x + \cos^2 x] \rightarrow \frac{1}{2} \leq \sin^2 x + \cos^2 x \leq 1 \rightarrow 0 \leq B \leq 1 \rightarrow R_y = [0, 1] \checkmark$$

$$b) \text{ الف) } y_2 = \frac{(2n^2 + \sqrt{n} - \varepsilon)}{n + \varepsilon} \rightarrow \frac{2n^2 + \sqrt{n} - \varepsilon}{\frac{-2n^2 + \sqrt{n}}{-n - \varepsilon} + \frac{n + \varepsilon}{-n - \varepsilon}} \mid \frac{n + \varepsilon}{2n - 1} \quad (1, \Delta)$$

$$\rightarrow y_2 = \frac{(n + \varepsilon)(2n - 1)}{(n + \varepsilon)} \cdot 2(2n - 1) \rightarrow n \neq \varepsilon \rightarrow y \neq 9$$

$$\rightarrow R_{y_2} (R - \{-9\}) \checkmark$$

$$b) y_2 = \frac{n^3 - 1}{n - 1} \cdot \frac{(n - 1)(n^2 + n + 1)}{(n - 1)} \cdot 2n^2 + n + 1$$

$$\rightarrow \frac{-b}{2a} = \frac{-1}{2} \rightarrow \frac{1}{2} - \frac{1}{2} + 1 = 1 \cdot \frac{3}{2} = y_{\min}$$

$$\rightarrow R_{y_2} \left[\frac{3}{2} + \infty \right) - \left[\frac{3}{2} \right) \rightarrow n_2 = 1 \rightarrow y_2 = 3$$

$$f_{n+1} = f_{n-1} = 3$$

سكنى است و 3 حذف نمیشه